ABSTRACT

The hydrogen permeating to a post-separation side (11B) of the membrane hydrogen separator (11) is supplied to an anode chamber (2A) of a fuel cell stack (2) via a hydrogen supply passage (25). A hydrogen recirculation passage (8) recirculates hydrogen from the anode chamber (2A) to the post-separation side (11B). When the hydrogen partial pressure on the post-separation side (11B) increases, air is introduced into the hydrogen recirculation passage (8) from an intake valve (30). When the hydrogen partial pressure decreases, gas in the hydrogen recirculation passage (8) is discharged from an exhaust valve (60). The rate of hydrogen permeation through the membrane hydrogen separator (11) is thereby maintained to a preferred level.